

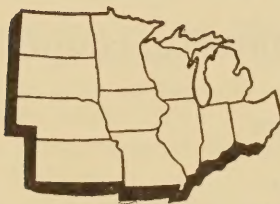
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WEIGHTS OF FOODS EATEN PER MEAL BY  
242 WOMEN 30 TO 92 YEARS OF AGE



NORTH CENTRAL REGIONAL PUBLICATION 37

MICHIGAN STATE COLLEGE  
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## FOREWORD

There has doubtless been much conjecture in the recent past concerning the quantity of various foods consumed by individual members of certain human populations. In many instances the published estimates of average human dietaries has been based upon the disappearance of food supplies and not upon actual measurements at the point of consumption. It appeared evident, therefore, that our knowledge of the actual consumption of various human foods would not be complete and accurate until the weighed intake of them was actually determined in the instance of a considerable number of typical subjects, over a considerable area, and for an adequate period of time.

This is the type of study which could logically be developed as one phase or section of the major regional research project designated as "Nutritional Status and Dietary Needs of Population Groups in the North Central Region." When so organized, it brought to a focus the interests and capabilities of a number of skilled specialists under whose supervision such studies could be conducted. Moreover, it thus moved into a number of fairly widely separated communities in a half-dozen states, thus affording a more adequate and representative sample of the American population than would have been true had such a study been conducted by only one agricultural experiment station within its state boundaries. At the same time it was possible to observe the relationship of the relative abundance and availability of local food supplies to the level of consumption when the several communities were compared.

The care and precision with which these records were accumulated appear to have involved a high level of accuracy. Accordingly the data here presented in tabular form and graphs should constitute a significant and useful contribution to the determination of the nature and quantity of American food consumption. From them emerges a more objective estimate of the weights of typical servings of various foods than has hitherto been available. Related data concerning the adequacy of diets involving such servings will be presented in a later publication in this series. It is anticipated that the observations here recorded will be of special service to those responsible for the purchase and preparation of foods served in hospitals and homes which care for women in the age ranges covered by these studies. Presently

these data may prove to be very useful in developing food composition tables to be applied in computing the nutritive value of diets for various age groups. As supplemented by related data for men and children, they may even find application in planning long-range agricultural production.

## SUMMARY

Records of weighed diets of 242 women, ages 30 to 92 years, from Iowa, Michigan, Minnesota, Nebraska, South Dakota and Wisconsin, were examined for weights of selected foods eaten at one meal. The number of daily records for each subject ranged from 5 to 70; the total number of records examined was 3,170. The number of subjects from each state varied from 4 Wisconsin women to 66 from Minnesota. The diets eaten by the subjects were self-selected and were prepared at home. The weight recorded was that of the food actually consumed during the meal.

The foods studied were selected on the basis of frequency of occurrence in menus. Complete diets were not tabulated. The number of servings represented varied from 31 servings of lamb to 5,152 servings of bread.

Most of the subjects showed wide variation in the weights of the same foods selected at different meals. There was a similar variation between subjects. However, mean and median amounts eaten of any given food were similar, so that the very small or very large amounts did not greatly affect the mean trend. A limited statistical analysis suggested that there were certain foods for which state differences in amounts eaten could be considered significant. Averages from South Dakota were more frequently different than were the averages from other states.

Mean serving weights and distribution of weights were found to be similar from state to state. No state was consistently high or low in average amounts eaten of any of the foods studied.

Subjects in the advanced age groups tended to eat smaller amounts of foods than did the younger women. There were variations from decade to decade in servings of most foods, but a decrease in serving size of nearly all foods occurred at age 70 and over.

A table of suggested average serving weights for use in the calculation of dietaries of groups of older women is included in this report.

## Weights of Foods Eaten Per Meal by 242 Women 30 to 92 Years of Age

Dietary records from which to determine nutritive intake are indispensable in many phases of food and nutrition research. It frequently is impracticable to secure records of weighed food intake for large population samples. Moreover, the time, supervision and equipment required for such a weighed record may interfere with the usual eating practices of the persons being studied (Ohlson *et al.*, 1950). Measuring the individual's food intake in cups and spoonfuls or other household units reduces the work required, but still demands active participation of the subject and may influence the kind and amount of food eaten.

Although important at any time, the amount of food eaten as stated in a diet record becomes especially important when the variety of foods eaten is unusually small or unusually large. Large servings of a few foods may supply an adequate nutritive intake even though the variety is limited. Small intakes of a large variety of foods also may total an adequate intake. However, variety alone is no guarantee of nutritive adequacy. This depends on the kind of food selected and the size of the portions eaten.

The present study provides some information on amounts of certain foods eaten at one meal for a limited sample of the population. The study is based on records of weighed food intake which were kept as part of a study of the nutritional status and dietary practices of more than 2,000 women who ranged in age from 30 to 92 years. Preliminary evaluations of total food consumed suggested that these women had total food intakes lower than the published standard allowances for women. Since they appeared to be eating a limited variety of food, it seemed possible that they might be making up for a lack of variety by eating larger servings. Therefore, weighed dietary records kept by 242 of the women ranging from 30 to 92 years of age were analyzed for the amount of food eaten at a given meal. The average amounts of some selected foods eaten during successive decades were studied.

It is hoped that this information will be helpful to all those whose work requires a knowledge of the amounts of foods customarily eaten

at one meal and that it will stimulate more extensive investigation of this problem.

## DESCRIPTION OF SUBJECTS AND METHODS

Records of weighed food intakes of 242 women from Iowa, Michigan, Minnesota, Nebraska, South Dakota and Wisconsin furnished the data for this report. The diets were self-selected from foods purchased and prepared in their homes by the women themselves, or by members of their families and insofar as possible reflected their usual eating practices. The women were furnished with a spring-type<sup>1</sup> dietetic scale and were carefully instructed in its use. The supervisor called at least once a day to collect the food records and to check on descriptions and weights of foods eaten and to answer questions. The weighed food record included 1) the weight of food served the subject, 2) the weight of uneaten food and 3) the difference. The latter figure is the one used in this analysis as representing food actually eaten.

The women ranged in age from 30 to 92 years and were free from acute illness during the time of the study. They were chosen as subjects from a larger group of women who had been contacted during the survey of nutritional status. Choice was based on age, willingness to cooperate and residence in the same community as the investigating laboratory. In general, these women formed a selected sample since many were in the middle and upper socio-economic groups while only a fourth of the sample had limited buying power (Ohlson *et al.*, 1952).

The number of women studied in each state and the number of days of weighed dietary records are summarized in Table 1. The number studied ranged from 4 in Wisconsin to 66 in Minnesota. There was a total of 3,107 daily records from which to study weights

TABLE 1—Sources of data

State	Number of subjects	Number of daily records per subject	Total number of daily records
Iowa.....	56	4—17	630
Michigan.....	18	70	1,260
Minnesota.....	66	7	462
Nebraska.....	45	7—10	318
South Dakota.....	53	7	371
Wisconsin.....	4	30—34	129
Totals.....	242	4—70	3,170

<sup>1</sup>Hanson or Chatterton.

of foods eaten. The number of daily records per woman ranged from 5 to 70, but three-fourths, or 183 of the women, kept records of weighed intakes for a 7-day period. Because the Michigan subjects kept records for 70 days, this group of 18 women accounted for 1,260 days or 40 percent of the records analyzed. After the first 25 to 30 days, the Michigan women were asked to increase or decrease the amount of milk consumed, but no other restrictions or directions were given for choice of foods. A preliminary examination of the records of food intake indicated that neither the weights of food eaten nor the range of portion sizes was different during milk restriction from that during the preliminary period of completely self-selected diet except in the case of the portion of milk used on cereal (see Table 7).

**TABLE 2—Percentage of subjects in each decade from 30 through 90 years in each state**

State	Total number of subjects	Age group						
		30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-89 years	90-99 years
		%	%	%	%	%	%	%
Iowa.....	56	21.4	28.6	21.4	12.5	14.3	1.8	...
Michigan.....	18	....	5.6	38.9	33.3	22.2	...	...
Minnesota.....	66	24.2	21.2	27.3	10.6	13.6	1.5	1.5
Nebraska.....	45	22.2	33.3	31.1	8.9	4.4	...	...
South Dakota.....	53	17.0	15.1	24.5	17.0	17.0	9.4	...
Wisconsin.....	4	50.0	50.0	....	....	....	...	...
All States.....	242	20.2	23.1	26.4	13.6	13.2	2.9	0.4

Table 2 shows the distribution of ages of the 242 women included in this study as percentage of subjects from each state in each decade. Approximately one-half of the subjects from Iowa, Minnesota and Nebraska were less than 50 years of age and about 75 percent were under 60 years. The subjects from Michigan and South Dakota were somewhat older, only about 50 percent being less than 60 years and 75 percent under 70 years of age. The four subjects from Wisconsin were all less than 50 years old. There were seven women in the decade from 80 to 89 years and just one in the decade from 90 to 99 years.

For the purpose of this study, the weight recorded was the total amount of a given food eaten at one meal. For example, all butter or margarine added at the table at one meal was considered as a unit, even though it was used in several ways—for example, on both bread and vegetables. An attempt was made with the Iowa records to differentiate between the weight of food which a woman called a

“serving” and the weight of food actually eaten by that woman at a meal. There was little consistency from day to day, and the woman tended to call any amount of food eaten “one serving.”

The data presented do not necessarily represent complete dietaries because not all of the foods eaten were included in the study. Selected fruits, vegetables and meats, milk, bread, table fat and sugar were chosen for tabulation of the weights eaten because of the frequency of use. Many other foods occurred so infrequently that the amounts chosen would have had little significance. Combined dishes such as casseroles, mixed salads and creamed foods (except potatoes) were omitted from this analysis. Only raw cabbage was included because few servings of cooked cabbage were reported. Cooked tomatoes were included because they were most often served separately. However, raw tomatoes were omitted because they usually were combined with other foods in salads or used as garnishes. Cooked and raw carrots were listed separately because of the difference in the amounts eaten. In general, weights were recorded for cooked rather than raw vegetables, and for both cooked and raw fruits. Because potatoes were served in a variety of ways, the weights eaten were sorted according to the method of preparation. Each weight of potatoes was listed under both the heading, “all potatoes” and under the method of preparation. If the cooking method was not known, the weight of the serving was listed under “all potatoes” only. Sugar and cream added to beverages were listed separately from sugar and cream or milk added to cereal or fruit. All kinds of bread, except coffee bread and rolls, were included in the tabulations.

The diet records were analyzed to find the average weight of the food eaten 1) by each subject, 2) by all the subjects in each state and 3) by all subjects in all six states—in other words, an individual, a state, and a regional mean—for each of the foods studied.

Average weights of foods eaten first were computed in two ways for each of the foregoing classifications of subjects. One mean, which will be referred to as the *portion average*, was obtained by dividing the total weight of all food eaten by all the subjects within a state by the total number of meals in which the food was used. This method gives equal weight to each amount chosen and, therefore, is influenced by extremely high or low weights selected by one woman, by undue frequency of choice by a few women, and by longer than usual observation periods.

The second mean, which will be referred to as the *subject average*,

was determined for each food studied by dividing the sum of the mean weights chosen by each of the subjects in each state by the number of subjects eating that food. The influence of the number of times a food appeared on the menu must be recognized in interpreting this mean. If a food was eaten only once during the period of observation, that weight of food was also the average weight. When a woman ate the same kind of food more than once the number of times varied from 2 to 222.

In most instances, the differences between the average weights calculated by these two methods were small. Where differences did occur, one method did not give averages consistently higher or lower than the other method. However, it seemed wise to test whether the method of computation affected the values found and a limited statistical study was made.

The significance of the differences between averages was tested on a selected sample of food items. The size of the sample, the difference between the two averages and the distribution of the food among the various individuals were considered in selecting the test sample. Table 3 gives the values of 't' found on direct comparison of the two averages computed for each of nine food items. Because

*TABLE 3—Significance of differences of two averages used in computation of food portions*

Food	Total DF	"t"†
All potatoes.....	2,204	0.043
Mashed potatoes.....	444	1.331
Raw cabbage.....	210	2.238*¶
Cooked tomatoes.....	247	0.638
Roast beef.....	597	2.086*
Chops.....	218	0.754
Apples‡.....	652	1.111
Bananas.....	475	0.198
Milk§.....	1,270	1.080

$$\dagger 't' = \sqrt{\frac{\frac{m_1 - m_2}{s} \frac{s}{x_1 + x_2}}{\frac{s}{x_1 + x_2}}}$$

†Includes applesauce.

§Michigan data omitted because milk intake was controlled during certain periods.

¶\*Indicates a probability of a significant difference less than 0.05.

$$2't' = \sqrt{\frac{\frac{m_1 - m_2}{s} \frac{s}{x_1 + x_2}}{\frac{s}{x_1 + x_2}}}$$

TABLE 4—Analysis of variance of individual and age differences, Michigan data only

Food	Total DF	F Value for individual differences†	F Values for age differences‡
All potatoes.....	866	14.895**§	13.231**
Mashed potatoes.....	87	1.249	2.542
Raw cabbage.....	90	0.869	4.219*
Cooked tomatoes.....	75	8.636**	2.237
Roast beef.....	161	3.660**	4.610**
Chops.....	59	2.405**	6.547**
Apples.....	207	3.112**	0.277
Bananas.....	137	2.116**	1.837

† DF for individual differences, 14 to 17.

‡ DF for age differences, 2.

§ \*\*Indicates a probability of a significant difference greater than 0.01.

\* Indicates a probability of a significant difference greater than 0.05.

of the limited number of subjects and age groups represented, data from Wisconsin were omitted from all statistical calculations. Data from Michigan subjects were omitted in the tests for milk as a beverage.

In the case of roast beef and raw cabbage, there was a slightly better than 1 in 20 chance that the method of computation of the average influenced the mean trend of the data, reflecting the performance of the person who ate the food frequently and in amounts that were consistently high or low in relation to the total group of women. Inspection of the means for other foods suggested that the same trend could be expected in the case of fish, ground beef, chicken, creamed potatoes, peaches, pears, citrus fruit juices, cream or milk on cereal and milk as a beverage. In almost every instance, the difference between averages was greatest for Michigan subjects and suggested that a longer period of observation of all subjects would exaggerate the influence of the woman who ate a food frequently and in amounts characteristic of her liking for the food. This effect was tested further by analysis of variance on the data from Michigan only, separating the influence of individuals and age groups. In the case of all potatoes, cooked tomatoes, roast beef, chops, apples and bananas, it was apparent that the individual behaved in a consistent manner with respect to the amounts of these foods eaten at one meal (Table 4). There was no distinction between individuals in the amounts of mashed potatoes or raw cabbage consumed at one meal. The amount of beverage milk was not checked since the milk intake was controlled for 40 or more of the 70 days during which each Michigan woman was observed.

Since this was a limited study of amounts of food eaten at one meal by a selected segment of the population—but the only such

**TABLE 5—Analysis of variance of state and age differences based on average portions eaten per subject†**

Food	Total DF	F Values for state differences	F Values for age differences
All potatoes.....	229	3.59**§	22.23**
Mashed potatoes.....	137	1.50	4.19**
Raw cabbage.....	57	2.48*	0.67
Cooked tomatoes.....	73	1.50	0.56
Roast beef.....	143	0.64	2.12
Chops.....	72	0.25	0.96
Apples (includes applesauce).....	133	3.24*	1.42
Bananas.....	129	4.53**	0.26
Milk†.....	152	8.98**	2.56*

† 5 States—6 age groups (except for milk).

‡ Omitting data from Wisconsin and Michigan.

§ \*Indicates a probability of a significant difference less than 0.05.

\*\*Indicates a probability of a significant difference less than 0.01.

direct analysis on record—both averages have been retained in the presentation of the data. At this point, it would seem to be important that individual as well as group differences be recorded, even though small, since this information points out the wide variation in performance among women and suggests caution in the acceptance of an “average” portion in the interpretation of survey data.

The data on nine foods were explored further by use of analysis of variance in an attempt to separate state and age differences (Table 5 and 6). Because the distribution of subjects among age groups varied

**TABLE 6—Analysis of variance of state and age differences based on average of each portion eaten†**

Food	Total DF	F Values for state differences	F Values for age differences
All potatoes.....	1,975	28.72**§	57.66**
Mashed potatoes.....	307	1.70	3.89**
Raw cabbage.....	153	1.98	4.43**
Cooked tomatoes.....	174	1.49	2.91
Roast beef.....	454	0.33	3.37**
Chops.....	146	0.19	2.33*
Apples (includes applesauce).....	519	2.95*	0.55
Bananas.....	346	6.20**	1.36
Milk†.....	1,118	36.34**	8.43**

† 5 States—6 age groups (except for milk).

‡ Omitting data from Wisconsin and Michigan.

§ \*Indicates a probability of a significant difference less than 0.05.

\*\*Indicates a probability of a significant difference less than 0.01.

from state to state, these analyses are suggestive rather than definitive of significant differences, as it was not possible to remove the interaction between state and age effects. It is of some interest that, in the case of the four foods in which there were significant differences between the size of the mean portion recorded for each state, the South Dakota mean was in each case the deviant value and in each case the mean portion eaten was the smallest mean recorded for that food item. This relationship holds for a number of other food items not tested (Tables 7 to 11, inc.). 't' tests were computed for all potatoes between the mean for each state and the mean for all states and also between the mean for each state against every other state in the series. Only those combinations which included the South Dakota data were significantly different (probability approximately 0.01).

The analyses for differences attributable to age were not very informative, in part because the effect of age would not seem to be important until after the seventh decade (Table 13) and, also, because the number of observations in the upper age ranges was few.

Data on 212 of the 242 subjects were available for the determination of mean and median weights from the frequency distribution of the weights of the individual servings of each food. (The data for 26 of the Nebraska subjects and 4 Wisconsin subjects had been calculated in such a way that they could not be included in this treatment.

The general character of the data did not seem to warrant more detailed statistical treatment.

## RESULTS AND DISCUSSION

Tables 7 through 11 summarize the information on the number of servings recorded for the foods studied, the *portion averages*, and the *subject averages* for the women in each state and for the entire group of 242 women in the six states. Weights of the largest and the smallest portions eaten also are given for each food. With but few exceptions, ranges for different states overlapped, and the data have been combined for all the women in all the states in spite of the fact that four of the nine foods tested suggested significant state differences (Tables 5 and 6). It is probable that the mean values for all states should not be applied to a sample from South Dakota without further testing. On the other hand, the inclusion of the data from South Dakota had little influence on the final means because of the relatively large number of total records examined.

TABLE 7—Average weights in grams of meat, fish, and fowl chosen by 242 subjects from 6 states

Food	State						Total all states
	Iowa	Michigan	Minnesota	Nebraska	S. Dakota	Wisconsin	
FISH							
Number of servings...	37	84	41	25	30	9	226
Portion average*.....	86	99	82	83	81	70	89
Subject average†.....	87	81	83	80	79	72	82
Range‡.....	25-250	14-420	22-260	6-240	20-190	54-125	6-420
BEEF, roast, pot roast							
Number of servings...	110	162	65	59	93	10	499
Portion average.....	65	61	64	70	63	55	64
Subject average.....	72	62	66	77	66	56	69
Range.....	9-200	18-220	15-150	20-142	10-187	13-100	9-220
GROUND BEEF							
Number of servings...	54	106	39	43	38	11	291
Portion average.....	63	89	70	74	58	92	75
Subject average.....	63	79	70	76	60	92	69
Range.....	26-150	15-308	27-130	30-144	25-129	40-134	15-308
STEAK							
Number of servings...	71	93	56	27	40	8	295
Portion average.....	75	85	84	83	73	106	81
Subject average.....	76	81	86	88	78	106	82
Range.....	20-167	26-216	19-205	21-185	13-170	16-230	13-230
LOAF							
Number of servings...	31	42	34	20	8	14	149
Portion average.....	84	91	89	91	73	86	88
Subject average.....	92	90	91	91	71	89	89
Range.....	30-170	18-214	38-152	30-150	20-105	55-157	18-214
PORK, except chops							
Number of servings...	49	75	25	15	50	13	227
Portion average.....	64	51	65	68	56	84	60
Subject average.....	67	58	59	69	60	81	63
Range.....	15-180	10-130	24-156	23-120	10-184	56-119	10-184
HAM							
Number of servings...	66	137	35	38	30	12	318
Portion average.....	54	51	60	52	56	57	54
Subject average.....	54	60	56	49	61	63	56
Range.....	14-122	6-206	19-231	21-123	11-140	20-84	6-231
BACON							
Number of servings...	103	162	80	70	52	14	481
Portion average.....	12	17	15	11	16	10	14
Subject average.....	13	18	16	11	17	10	15
Range.....	1-71	4-84	3-48	3-25	3-59	3-19	1-84
CHOPS							
Number of servings...	46	60	21	20	11	8	166
Portion average.....	72	68	69	64	64	70	69
Subject average.....	68	65	72	66	61	66	67
Range.....	23-160	20-246	29-156	24-113	37-105	67-80	20-246
LAMB, except chops							
Number of servings...	..	12	12	5	1	1	31
Portion average.....	..	73	72	82	60	86	74
Subject average.....	..	71	71	76	60	86	72
Range.....	..	24-120	35-140	43-149	60	86	24-149
VEAL, except chops							
Number of servings...	4	29	9	3	4	1	50
Portion average.....	103	87	75	83	87	93	86
Subject average.....	103	70	81	90	97	93	84
Range.....	35-180	22-224	35-135	25-115	39-180	93	22-224

TABLE 7—Continued

Food	State						Total all states
	Iowa	Michigan	Minnesota	Nebraska	S. Dakota	Wisconsin	
CHICKEN							
Number of servings...	47	45	22	25	15	6	160
Portion average.....	77	74	81	86	89	66	79
Subject average.....	91	71	73	93	86	80	85
Range.....	25-300	20-212	30-170	27-200	25-200	25-125	20-300
LIVER							
Number of servings...	32	38	17	14	13	4	118
Portion average.....	67	80	66	69	62	76	71
Subject average.....	70	78	70	76	63	76	71
Range.....	35-115	25-195	35-104	40-105	26-92	..	25-195
FRANKFURTERS							
Number of servings...	31	78	22	18	13	8	170
Portion average.....	67	68	67	67	46	80	66
Subject average.....	61	72	72	69	45	76	66
Range.....	30-128	20-324	12-118	20-104	8-84	40-102	8-324
LUNCHEON MEAT							
Number of servings...	24	174	44	28	31	10	311
Portion average.....	45	52	46	47	34	25	48
Subject average.....	44	46	48	50	34	26	44
Range.....	10-200	5-160	11-181	14-107	10-60	10-40	5-200

\*Portion average—Total weight of all servings divided by the number of servings.

†Subject average—Sum of the average portion for each subject divided by the number of subjects.

‡Range of serving weights.

#### NUMBER OF TIMES CERTAIN FOODS WERE EATEN

There was wide variation in the total number of times the different foods were eaten by the various women, ranging from 31 for lamb to 5,152 for bread. Undoubtedly those averages derived from the larger number of cases are more representative of usual practice than those which were derived from only a few cases.

The variation in frequency of selection of foods is an interesting commentary of food habits. Beef and bacon, followed by ham and luncheon meat, were the meat most often selected. Lamb and veal were chosen least often. Potatoes, raw carrots, peas, and snap beans headed the list of vegetables in the number of times served. Cauliflower, parsnips, and spinach were eaten less frequently. Citrus fruits and juices, apples, peaches, and bananas were included in the diet more often than were other fruits, and cherries were eaten the least often. The season in which the food record was kept would influence frequency of certain choices, especially of fruits and vegetables. However, a monthly tabulation of amounts eaten of certain vegetables and chicken did not suggest that season influenced the weight of food eaten at any one meal.

TABLE 8—Average weights in grams of vegetables chosen by 242 subjects from 6 states

Food	State						Total all states
	Iowa	Michigan	Minnesota	Nebraska	S. Dakota	Wisconsin	
ASPARAGUS (ckd)							
Number of servings...	11	45	32	16	22	11	137
Portion average*.....	71	87	74	75	76	63	78
Subject average†.....	72	79	77	70	79	72	76
Range‡.....	30-120	20-215	26-146	40-125	21-153	30-94	20-215
BEANS, snap (ckd)							
Number of servings...	88	78	48	44	35	12	305
Portion average.....	65	70	70	76	64	56	68
Subject average.....	63	71	69	79	64	66	69
Range.....	10-208	20-194	20-160	20-196	15-140	35-110	10-208
CABBAGE (raw)							
Number of servings...	12	91	26	15	19	12	175
Portion average.....	45	64	64	70	54	61	62
Subject average.....	36	58	61	67	53	58	56
Range.....	10-90	5-160	30-120	28-140	15-102	38-86	5-160
CARROTS (ckd)							
Number of servings...	45	98	38	24	38	6	249
Portion average.....	52	76	60	69	45	42	63
Subject average.....	50	72	63	69	47	42	59
Range.....	19-150	22-350	25-142	22-120	15-140	36-47	15-350
CARROTS (raw)							
Number of servings...	77	68	78	55	33	19	330
Portion average.....	27	16	33	29	29	17	26
Subject average.....	28	19	33	28	28	17	28
Range.....	4-75	2-39	5-130	5-70	8-67	6-40	2-130
CAULIFLOWER (ckd)							
Number of servings...	11	6	7	5	6	4	39
Portion average.....	58	80	79	77	48	88	69
Subject average.....	58	79	84	77	41	77	70
Range.....	20-94	50-140	48-139	46-106	17-108	45-150	17-150
CORN (ckd)							
Number of servings...	46	81	39	25	25	8	224
Portion average.....	67	80	68	85	67	45	73
Subject average.....	68	79	72	91	73	46	75
Range.....	18-123	10-207	31-172	13-185	18-182	12-70	10-207
PARSNIPS (ckd)							
Number of servings...	7	27	4	6	3	..	47
Portion average.....	73	85	101	88	69	..	84
Subject average.....	68	83	106	94	69	..	84
Range.....	26-196	20-280	54-137	60-167	36-115	..	20-280
PEAS (ckd)							
Number of servings...	73	108	63	39	33	10	326
Portion average.....	68	83	68	82	66	79	75
Subject average.....	66	82	75	73	68	83	72
Range.....	20-160	10-334	20-143	22-197	10-180	45-112	10-334
SPINACH (ckd)							
Number of servings...	35	29	12	13	8	2	99
Portion average.....	79	73	82	91	62	24	77
Subject average.....	82	66	76	93	64	24	77
Range.....	23-150	15-130	34-200	37-176	25-115	13-34	13-200
TOMATOES (ckd)							
Number of servings...	25	76	28	13	37	5	184
Portion average.....	103	113	132	119	102	98	113
Subject average.....	103	121	136	126	96	100	115
Range.....	20-300	28-381	30-280	50-186	15-288	48-160	15-381

TABLE 8—Continued

Food	State						Total all states
	Iowa	Michigan	Minnesota	Nebraska	S. Dakota	Wisconsin	
TOMATO JUICE							
Number of servings...	69	91	56	10	33	13	272
Portion average.....	148	125	128	117	106	117	128
Subject average.....	149	113	126	123	110	117	128
Range.....	25-472	15-266	20-260	55-142	22-242	53-190	15-472

\*Portion average—Total weight of all servings divided by the number of servings.

†Subject average—Sum of the average portion for each subject divided by the number of subjects.

‡Range of serving weights.

### RANGE IN WEIGHT OF FOODS EATEN AT ONE MEAL

A wide range was found in the weights eaten of most foods. This range was due to both inter-individual differences and intra-individual differences. Some women were consistent in the amount of particular foods which they selected from time to time, while other women varied greatly in the weight of food eaten from day to day and from meal to meal. The weight of any food eaten at any time is no doubt influenced by such factors as how well the food is liked, whether it is left over from a previous meal, whether some is being saved for the next meal, how many other foods are served at the same meal, and many other variables which characterize the eating practices of families. The physical and mental well-being of the woman at mealtime would also affect the size of serving she chose.

Table 12 shows the distribution of records by differences in weight of the same food eaten at two or more times during the period of the study, and thus illustrates individual variations in the amount of food selected. The wide individual variations are lost in the expression of the figures as averages. For example, the average difference between the largest and smallest weight of table fat selected was 13 grams. Some women proved consistent in the weight of table fat they used from one meal to the next. Other women recorded wide ranges; the widest range was for a woman who recorded her smallest serving of table fat as 10 grams and her largest serving as 75 grams. In the case of table fat, particularly, the other items in the menu would influence the weight of the serving. A meal with baked potatoes, hot breads, waffles or pancakes would be likely to include more table fat than a meal with potatoes and gravy or escalloped potatoes, or a meal without breadstuffs.

TABLE 9—Average weights in grams of potatoes chosen by 242 subjects from 6 states

Food	State						Total all states
	Iowa	Michigan	Minnesota	Nebraska	S. Dakota	Wisconsin	
ALL POTATOES							
Number of servings...	445	867	291	211	283	79	2,176
Portion average*.....	94	90	98	95	80	91	91
Subject average†.....	95	95	94	95	80	88	91
Range‡.....	15-330	7-270	8-265	9-264	14-250	34-216	7-330
BAKED							
Number of servings...	42	56	43	13	21	14	189
Portion average.....	114	108	108	118	102	84	108
Subject average.....	120	112	107	114	100	97	110
Range.....	35-330	40-242	50-204	25-264	57-162	44-144	25-330
BOILED							
Number of servings...	118	66	113	64	103	2	466
Portion average.....	86	99	89	95	75	55	87
Subject average.....	87	83	89	93	72	55	84
Range.....	22-210	30-204	20-233	20-192	15-190	40-70	15-233
CREAMED							
Number of servings...	19	25	7	5	13	8	77
Portion average.....	104	115	120	127	102	62	106
Subject average.....	104	124	123	139	97	62	110
Range.....	59-198	22-230	92-200	84-211	56-200	34-104	22-230
ESCALLOPED							
Number of servings...	16	33	27	10	9	1	96
Portion average.....	123	119	121	126	104	216	121
Subject average.....	125	118	119	123	111	216	121
Range.....	54-294	15-265	40-222	40-215	30-165	216	15-294
FRIED, American							
Number of Servings...	66	87	21	24	40	7	245
Portion average.....	78	76	79	83	65	47	75
Subject average.....	81	74	80	84	68	59	77
Range.....	23-172	15-200	44-182	27-182	22-145	20-85	15-200
FRIED, French							
Number of servings...	11	16	7	7	6	..	47
Portion average.....	85	73	34	65	63	..	68
Subject average.....	74	66	43	65	63	..	64
Range.....	15-150	15-110	8-100	45-86	14-123	..	8-150
MASHED							
Number of servings...	108	88	35	45	57	24	357
Portion average.....	107	110	110	104	89	93	102
Subject average.....	101	103	103	105	89	94	99
Range.....	34-305	20-270	16-265	20-195	25-250	45-162	16-305

\*Portion average—Total weight of all servings divided by the number of servings.

†Subject average—Sum of the average portion for each subject divided by the number of subjects.

‡Range of serving weights.

In several instances, the same woman recorded both the largest and the smallest amounts of a food eaten. For example, the same Iowa woman reported the highest and lowest weights for servings of cherries in Iowa. In another instance, a woman in South Dakota who had the smallest portion of ground beef, at a later time, had the largest portion. In still other cases, the range of weights recorded by

one individual was as great, or nearly as great, as the total range in the weights of all the servings recorded by all subjects.

It is apparent that the ranges in amounts eaten, as given in Tables 7 through 11 record more than differences between small amounts of food chosen consistently by one woman and the larger servings chosen consistently by another.

**TABLE 10—Average weights in grams of fruits, cooked and raw chosen by 242 subjects from 6 states**

Food	State						Total all states
	Iowa	Michigan	Minnesota	Nebraska	S. Dakota	Wisconsin	
APPLES							
Number of servings...	72	208	129	95	89	46	639
Portion average*.....	106	106	99	122	88	112	105
Subject average†.....	102	114	97	113	85	105	100
Range‡.....	15-215	15-845	25-225	51-269	10-228	35-166	10-845
BANANAS							
Number of servings...	62	138	67	60	54	24	405
Portion average.....	87	87	90	83	60	62	82
Subject average.....	88	93	90	85	60	74	83
Range.....	22-180	13-290	15-200	40-180	12-130	20-150	12-290
CHERRIES							
Number of servings...	28	22	8	2	8	1	69
Portion average.....	114	84	55	67	77	110	92
Subject average.....	109	90	66	67	71	110	92
Range.....	45-216	17-163	18-120	63-70	10-120	110	10-216
PEACHES							
Number of servings...	86	196	61	44	56	12	455
Portion average.....	107	133	104	115	86	77	116
Subject average.....	106	121	102	114	86	78	104
Range.....	20-215	40-560	39-281	36-308	10-165	50-120	10-560
PEARS							
Number of servings...	35	50	36	20	21	8	170
Portion average.....	123	116	107	107	99	114	112
Subject average.....	129	135	110	114	94	124	118
Range.....	35-250	28-256	20-270	56-155	8-200	95-150	8-270
PINEAPPLE							
Number of servings...	15	40	16	26	16	3	116
Portion average.....	78	95	82	79	70	61	83
Subject average.....	89	100	83	80	83	61	85
Range.....	35-210	35-290	29-140	30-245	8-175	10-115	8-290
ORANGES and GRAPEFRUIT							
Number of servings...	160	302	176	123	94	6	861
Portion average.....	107	114	107	118	89	103	109
Subject average.....	112	112	105	115	89	122	106
Range.....	34-226	17-293	15-263	17-260	16-195	87-150	15-293
CITRUS FRUIT JUICE							
Number of servings...	227	433	212	125	143	79	1,219
Portion average.....	122	134	127	146	106	123	128
Subject average.....	121	120	122	141	108	118	121
Range.....	12-325	23-381	17-410	62-317	6-234	60-240	6-410

\*Portion average—Total weight of all servings divided by the number of servings.

†Subject average—Sum of the average portion for each subject divided by the number of subjects.

‡Range of serving weights.

**TABLE 11—Average weights in grams of certain miscellaneous foods chosen by 242 subjects from 6 states**

Food	State						Total all states
	Iowa	Michigan	Minnesota	Nebraska	S. Dakota	Wisconsin	
<b>BREAD, 1 serving</b>							
Number of servings...	517	2,482	806	476	668	203	5,152
Portion average*.....	33	38	36	36	36	37	37
Subject average†.....	31	37	36	36	36	36	35
Range‡.....	6-160	5-140	8-132	6-120	1-110	7-68	1-160
<b>BREAD, 1 slice</b>							
Number of servings...	43	..	685	145	55	..	928
Portion average... ..	25	..	25	25	24	..	25
Subject average.....	25	..	26	25	24	..	25
Range.....	14-38	..	10-52	14-30	14-38	..	10-52
<b>TABLE FAT</b>							
Number of servings...	698	2,087	882	495	633	213	5,008
Portion average.....	7.9	7.9	8.4	7.5	8.0	7.6	8.0
Subject average.....	7.9	8.0	8.3	7.2	8.6	7.9	8.1
Range.....	1-51	1-30	2-53	1-66	1-75	1-18	1-75
<b>SUGAR, beverage</b>							
Number of servings...	148	391	128	67§	102	12	848
Portion average.....	8.4	6.8	7.6	8.9	8.0	7.3	7.5
Subject average.....	8.3	8.3	8.6	9.5	8.6	9.4	8.6
Range.....	1-20	2-36	1-37	1-21	3-20	5-12	1-37
<b>SUGAR, cereal or fruit</b>							
Number of servings...	150	431	174	138	174	12	1,079
Portion average.....	7.5	8.9	10.1	9.0	10.8	8.4	9.2
Subject average.....	7.6	11.2	8.9	9.6	9.8	8.9	9.2
Range.....	1-20	2-61	1-46	1-31	1-74	5-15	1-74
<b>CREAM, beverage</b>							
Number of servings...	386	1,259	265	250	326	48	2,534
Portion average.....	15.6	24.6	18.9	21.4	15.2	19.1	21.0
Subject average.....	17.0	20.5	19.6	24.0	17.4	20.5	19.4
Range.....	2-88	2-133	2-73	2-96	2-110	7-62	2-133
<b>CREAM or MILK, cereal</b>							
Number of servings...	189	545	188	164	158	33	1,279
Portion average.....	88	105	83	89	80	44	93
Subject average.....	80	107	82	86	77	46	83
Range.....	5-277	8-280	12-226	10-257	7-220	20-96	5-280
<b>MILK</b>							
Number of servings...	320	¶	449	269	218	160	1,416
Portion average.....	216		224	241	171	217	217
Subject average.....	208		219	238	171	228	209
Range.....	45-624		35-633	78-485	22-320	22-671	22-671

\*Portion average—Total weight of all servings divided by the number of servings.

†Subject average—Sum of the average portion for each subject divided by the number of subjects.

‡Range of serving weights.

§Jelly included with coffee sugar for 19 subjects; these figures omitted.

¶Milk intake controlled, so size servings not included.

**TABLE 12—Differences between largest and smallest weights in grams of selected foods reported by women who ate a given food on two or more occasions**

Weight difference in grams	Ham	Roast beef	Bananas	Citrus fruit juice	Peas	Boiled potatoes	Table fat
	Number of records	Number of records	Number of records	Number of records	Number of records	Number of records	Number of records
0.....	2	2	0	5	0	2	2
1-9.....	4	11	12	14	6	9	87
10-19.....	6	14	11	13	13	19	103
20-29.....	7	10	15	30	14	12	25
30-39.....	10	7	8	13	12	11	2
40-49.....	10	20	1	12	6	22	5
50-59.....	2	14	3	7	5	11	..
60-69.....	6	14	10	7	5	8	2
70-79.....	5	7	4	11	5	4	..
80-89.....	1	3	2	3	3	6	..
90-99.....	1	3	3	8	1	5	..
100-109.....	2	2	3	5	..	4	..
110-119.....	..	..	4	4	3	1	..
120-129.....	1	3	..	5	..	..	..
130-139.....	..	..	1	3	1	1	..
140-149.....	..	1	..	3	..	..	..
150-199.....	1	1	4	11	1	1	..
200 and over.....	..	..	1	3	1	..	..
Total number....	58	112	82	157	76	116	226
Average Difference.....	45 gm	47 gm	52 gm	62 gm	45 gm	44 gm	13 gm

#### FREQUENCY DISTRIBUTIONS AND MEDIAN WEIGHTS OF FOODS EATEN

A number of frequency distributions of weights of food chosen selected for the different distribution patterns seen are shown in Figs. 1 through 7. In all cases, there was some skewing of the distribution to the right; that is, in the direction of larger intakes. There were more cases reported of single large amounts of a food eaten than of single small amounts, which probably reflects the fact that there are more limitations to how small a serving may be than to how large it may be.

For most of the foods studied, the distribution of weights of all portions was similar to the distribution of averages for each subject, as illustrated in Fig. 1. Both curves tended to follow a similar pattern, even though there were fewer items in the *subject averages*. Figure 1, based on weights of 278 portions of ham, is a typical curve with one peak and sharply sloping sides.

Another type of curve is found in Fig. 4—a bimodal distribution of weights of steak. This pattern expresses the fact that certain indi-

TABLE 13—Average weights in grams of selected foods eaten by subjects in successive age groups

Food	Average, all cases	Average weight for each age group, in grams						
		30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-89 years	90-99* years
MEATS:								
Fish.....: ..	82	83	86	88	77	66	44	..
Beef.....	69	77	72	70	64	61	43	50
Ground beef.....	69	70	73	76	61	60	40*	48
Steak.....	82	83	88	83	76	68	76	..
Loaf.....	89	91	99	81	100	67	..	..
Pork.....	63	64	72	60	74	49	51	24
Ham.....	56	54	59	61	49	55	23	38
Bacon.....	15	13	13	14	19	17	16	..
Chops.....	67	73	71	67	63	53	42*	..
Lamb.....	72	75	61	68	82	88*	..	..
Veal.....	84	97	110	83	60	66	35*	..
Chicken.....	85	88	87	82	97	72	33	..
Liver.....	71	79	69	67	69	72	70*	..
Frankfurters.....	66	66	61	70	73	54	..	..
Luncheon meat....	44	40	37	52	51	43	18	..
VEGETABLES:								
Asparagus.....	76	71	75	75	82	83	..	..
Beans, snap.....	69	68	68	68	66	80	30*	..
Cabbage, raw.....	56	58	55	60	45	56	58*	58
Carrots, ckd.....	59	57	60	60	66	64	28	48
Carrots, raw.....	28	25	33	26	31	31	21	12
Cauliflower.....	70	80	65	75	55	30*	..	..
Corn.....	75	66	77	77	83	81	62	..
Parsnips.....	84	34	115*	110	69	68	70	..
Peas.....	72	67	74	74	74	79	54	..
Spinach.....	77	76	88	67	84	80	49*	..
Tomatoes, ckd....	115	128	118	110	121	109	80	90
Tomato juice.....	128	132	145	116	126	115	61*	..
POTATOES:								
All.....	91	89	100	86	99	88	59	71
Baked.....	110	102	111	115	113	115	90	63
Boiled.....	84	78	96	80	84	86	61	74
Creamed.....	110	105	108	108	100	126	..	..
Escalloped.....	121	131	124	117	105	124	..	..
French fried.....	64	63	76	54	56	80*	..	..
Fried.....	77	77	90	70	77	73	53*	..
Mashed.....	99	94	104	94	120	92	59	..
FRUITS:								
Apples.....	100	92	106	103	108	97	49	93
Bananas.....	83	80	83	83	89	82	77	105
Cherries.....	92	99	101	74	100	93	..	..
Peaches.....	104	99	108	110	100	101	63	..
Pears.....	118	136	108	119	134	94	109	69
Pineapple.....	85	108	76	73	100	77	..	..
Orange—grapefruit.	106	102	108	108	108	103	92	95
Citrus fruit juice...	121	113	128	127	121	109	102	..
MISCELLANEOUS:								
Bread.....	35	35	35	35	37	36	27	..
Table fat.....	8.1	7.2	7.6	8.1	8.6	9.4	9.9	4.2
Sugar, coffee.....	8.6	10.1	9.3	7.9	7.0	8.9	7.6	..
cereal.....	9.2	8.5	8.6	8.9	9.1	10.9	13.9	3.0
Cream, coffee.....	19.4	16.3	19.3	22.2	18.0	18.5	25.8	..
cereal.....	83	81	79	92	85	81	57	30
Milk.....	209	223	224	192	210	184	192	212

\*Only one subject represented.

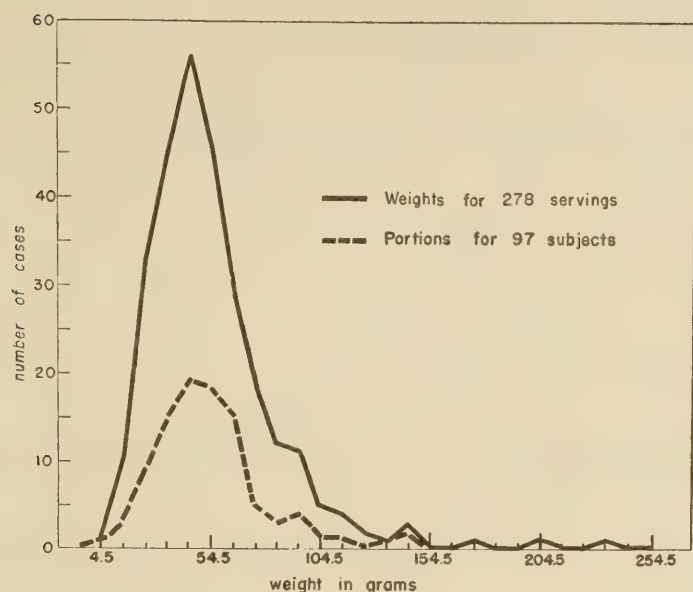


Fig. 1. Distribution of weights of ham eaten at one meal.

viduals tended to be consistent in that they ate either large or small amounts, rather than a varying amount of a particular food.

The distribution curves for weights of sugar added to cereals and fruits (Fig. 5) show a greater number of weights at 4, 5, 6, 8, 10 and 15 grams, with minor increases at 5-gram intervals to 35 grams. Be-

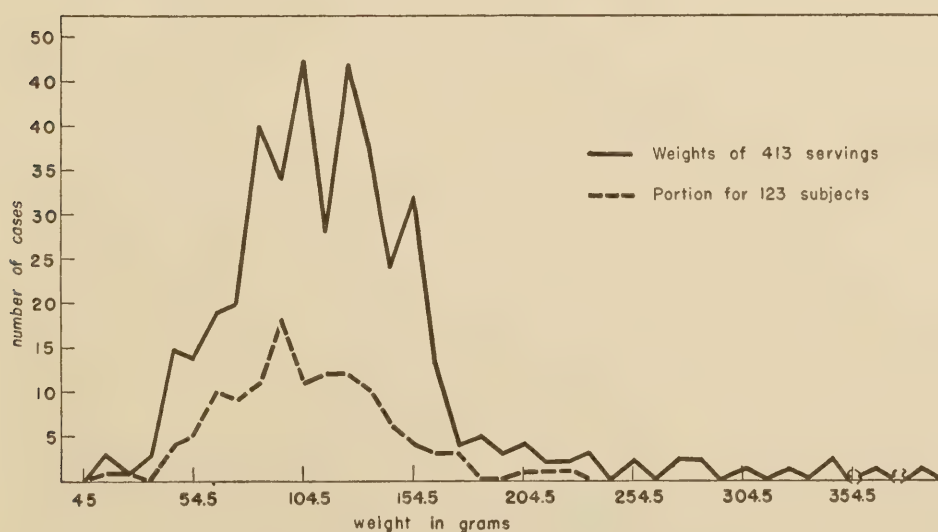


Fig. 2. Distribution of weights of peaches eaten at one meal.

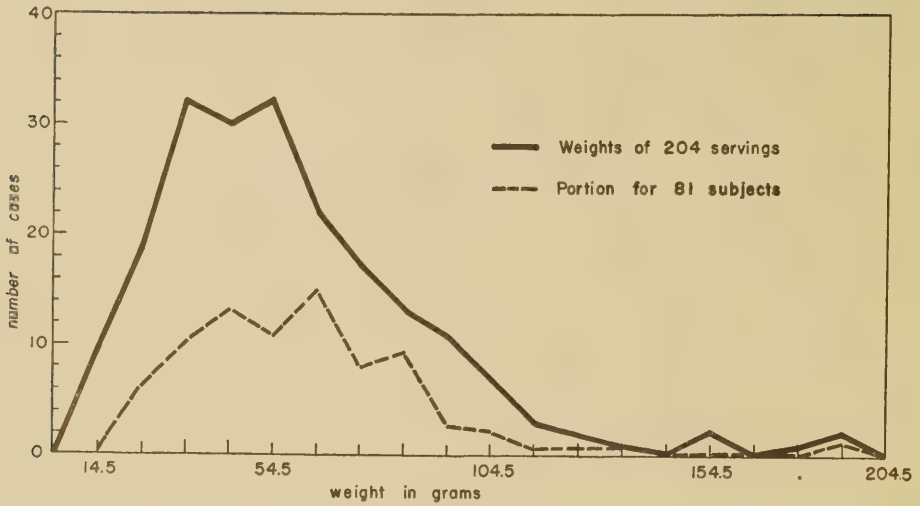


Fig. 3. Distribution of weights of pork eaten at one meal.

cause 5 grams is the approximate weight of one teaspoonful of sugar, the increase at 5-gram intervals can probably be explained by the number of teaspoons used. A similar pattern was found in the case of the table fat. Distribution peaks occurred at 4, 5, 6, 8, 10 and 12 grams, with the largest number of women eating 5 or 10 grams.

Figure 6, which gives the distribution of weights of cream added to beverages, shows a relatively large number of small weights. One-half of the portions of cream were equivalent to one tablespoon or

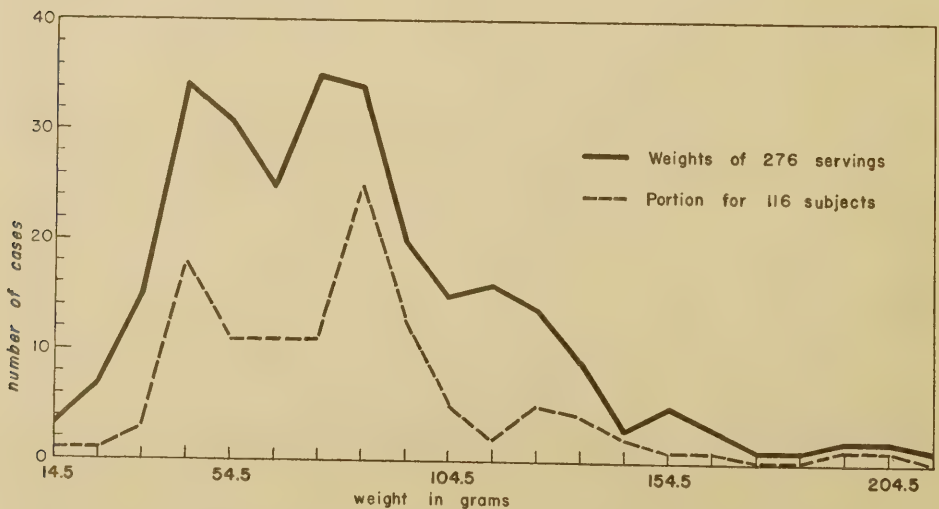


Fig. 4. Distribution of weights of steak eaten at one meal.

less, and most of the weights were below 30 grams (about two table-spoons).

The weight of one slice of bread, when such information was available from the diet records, was tabulated and the distribution of these

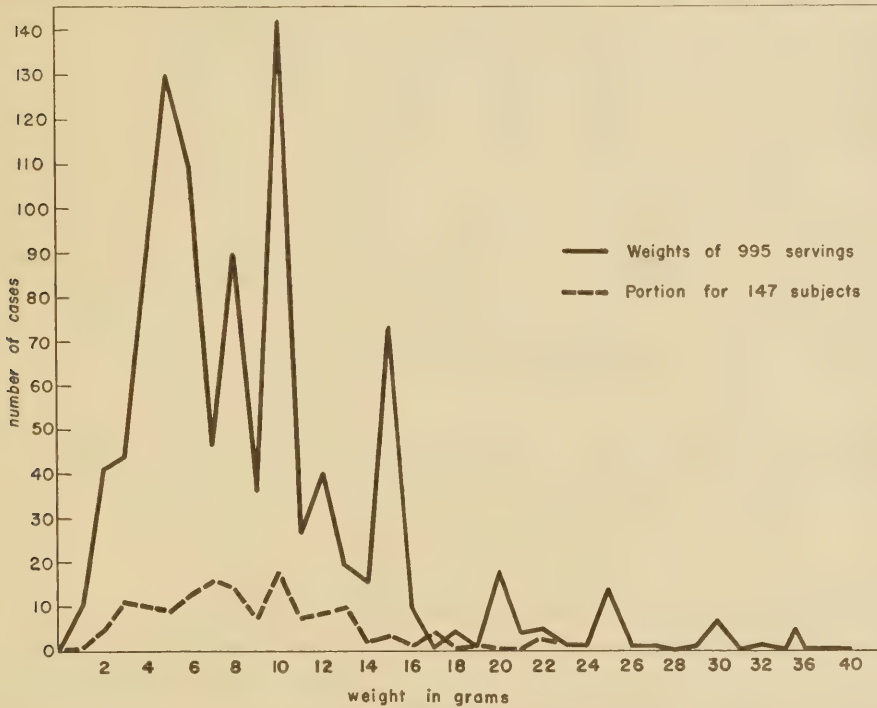


Fig. 5. Distribution of weights of sugar added to cereals or fruits at one meal.

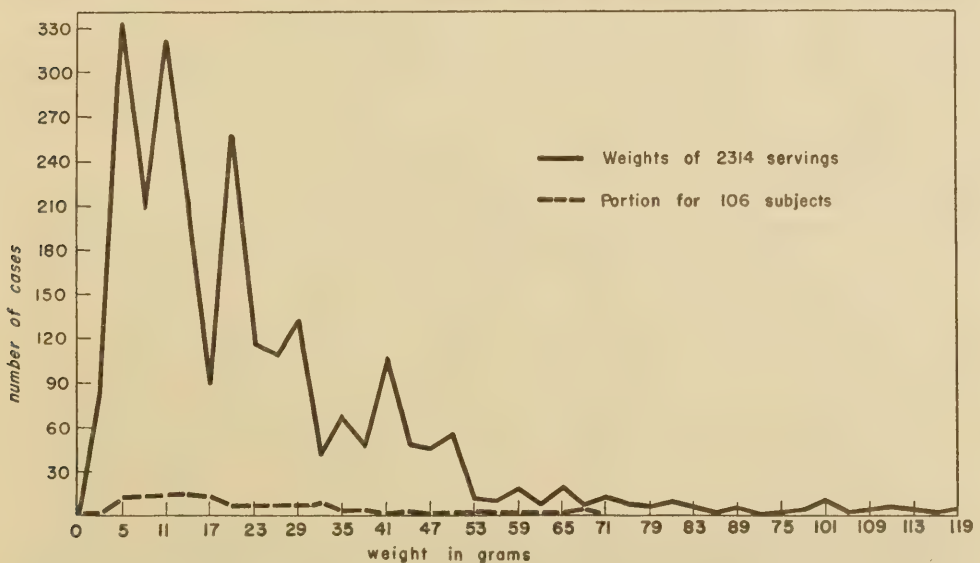


Fig. 6. Distribution of weights of cream added to beverages at one meal.

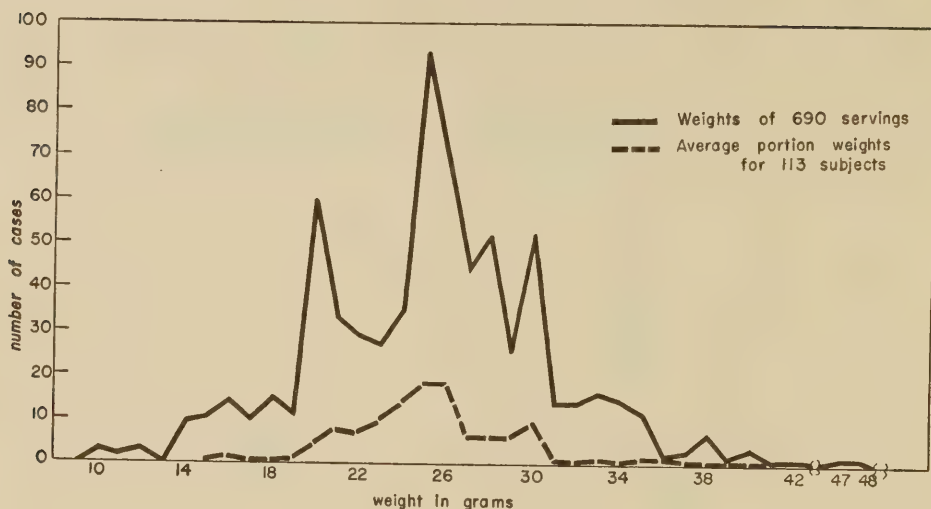


Fig. 7. Distribution of weights for one slice of bread.

weights is shown in Fig. 7. Most of the slices of bread weighed either 20, 25, 26, 28, or 30 grams. The average weight was 25 grams.

#### DIFFERENCES BY STATE

Although average weights of foods eaten tended to be similar in the six states, certain interesting exceptions occurred. In about one-half of the cases, the lowest average weights were recorded by the women from South Dakota, but the range of weights of foods eaten was not different from that of other states (Tables 3 through 7). In respect to four of the nine foods tested, this difference accounted for the significance of differences between states. The women in Michigan ate more and larger amounts of fish, on the average, than did the women from the other states, which might be accounted for by Michigan's large fishing industry as well as the longer period of observation for this study. In the same way, the average weight of beef eaten was higher, but not significantly so (Table 7), for the women in Nebraska, a beef-producing state. Larger average portions of chicken were reported for Nebraska, and South Dakota than for other states. Values for weighed portions of chicken were further subdivided by the month in which the record was taken, but no evidence of seasonal effect was seen. However, the study was not planned for uniform distribution of records throughout the year.

Not all variations could be explained by the supply of a particular food within a state. Average weights of ground beef were 89 to 92

grams, respectively, for Michigan and Wisconsin, while Iowa and South Dakota had the lowest average weights, 62 to 58 grams. In general, subjects from South Dakota and Wisconsin ate smaller amounts of vegetables, including potatoes, than did subjects from Iowa, Michigan, Minnesota, and Nebraska.

The South Dakota subjects also tended to eat smaller amounts of bananas, peaches, apples, pears, citrus fruits and pineapple. Average weights of 122 grams of apples and 146 grams of citrus fruit juices for Nebraska women were higher than the averages of 88 to 112 grams and 106 to 134 grams, respectively, for the other five states. Insofar as the effect of season could be evaluated, intakes at any one meal of vegetables and fruits showed no seasonal influence.

Average weights of bread, milk and sugar were, in most cases, very similar for all states. However, the average weight of bread eaten in Iowa was 33 grams, which was lower than the average of 37 grams for each of the other states. The Iowa subjects had smaller average amounts of sugar added to cereal and fruit (7.5 grams, as compared with the group average of 9.2 grams). Nebraska reported the largest amount of milk consumed at one meal, 241 grams, and South Dakota the lowest, 171 grams. The larger amounts of cream or milk added to cereals by Michigan subjects were the result of controlled milk intakes during part of the study as subjects who did not ordinarily drink milk used larger amounts on cereal during a period when they were requested to increase their intake of milk. The use of milk with cereal was the only food item in which the portion eaten at a meal varied in the periods of controlled milk intake as compared with the first 25 to 30 days of the study during which all diets were completely self selected.

#### AMOUNTS OF FOODS SELECTED IN SUCCESSIVE DECADES

Weights of foods eaten were determined for the women in each decade from 30 to 90 years and are presented in Table 8.

In general, there was little trend in the total portions of food eaten before the seventh decade, which is in keeping with the evidence on nutrient intake recorded by Ohlson *et al.*, 1952. After age 70, decreases in the intake of meats, vegetables, fruits and milk were recorded with few exceptions such as liver, which tended to be eaten in about the same amounts throughout the age ranges studied. Curiously, the amount of chewing required to masticate a food seemed to have little effect on its acceptance even in the higher age brackets. On the

other hand, the amounts of cream added to beverages, sugar to beverages, cereal and fruit and the amounts of table fats used increased particularly after the age of 50.

#### SUGGESTIONS FOR USE OF DATA PRESENTED

The least onerous record of food intake is obtained in terms of "servings." Because of ready availability, such records can be a valuable tool in evaluating nutritional status, and as a basis of programs for nutritional improvement of individuals or of groups. Moreover, survey records obtained by interview may impose less of the bias of the investigator into the eating performance of the subject and thus a more accurate picture of eating practices obtained than are possible under the more rigorous conditions which must be imposed when the entire diet is weighed (Ohlson *et al.*, 1950). However, the advantages of this method are also the reasons for its being the least accurate in quantitative terms; the greatest disadvantage being the variability in interpretation of a serving. A person judges a serving portion in terms of his own experience. The amount of food may be more or less than the amount which would be characteristic of the group.

Several methods have been used to determine the sizes of so-called average portions in existing tables of food values. In most instances, the foods were weighed and measured at different times by laboratory personnel or members of college classes and an "average serving" determined from such weights. The limitations of the method include, first, the fact that the weighing was most often done by young persons, usually women, whose eating patterns may be different than those of the large population groups for which the servings are later used; and, second, that in most cases, the measured or weighed portions were not eaten as a part of a mixed meal. Also, compilers of food tables have had different purposes in mind when selecting units, measures or weights for food tables. The amounts specified are not always planned to represent servings but rather a convenient fraction for use in calculation.

Except for explanations included in the introductions to food tables, no studies designed to measure the size of serving portions as eaten as a part of a mixed diet were found in the literature. Yet such information is needed in computation of nutrients in dietaries and in planning diets.

Table 14 presents a summary of the average weights of foods eaten and also suggests a table of weights which may be assigned to food

**TABLE 14—Mean and median weights in grams of selected foods eaten by 212 subjects, with suggested weights of average portions for use in calculating diets**

Food	Number of cases		Mean weights, in grams		Median weights, in grams		Suggested average portion weight, in grams
	Servings	Subjects	Portion average	Subject average	Portion average	Subject average	
MEATS:							
Fish.....	202	97	90	83	75	74	75
Beef, roast.....	455	143	63	68	60	63	65
Ground beef.....	263	109	76	69	74	67	70
Steak.....	276	116	80	80	76	80	80
Loaf.....	130	68	89	90	88	86	90
Pork, except chops....	204	81	57	61	53	60	60
Ham.....	278	97	53	55	48	51	50
Bacon.....	429	134	15	15	13	13	15
Chops.....	147	73	69	67	64	63	65
Lamb, except chops...	29	15	74	72	75	75	75
Veal, except chops....	49	24	86	84	70	75	75
Chicken.....	140	65	79	87	75	77	75
Liver.....	104	59	72	72	69	69	70
Frankfurters.....	151	57	65	64	61	62	60
Luncheon meat.....	277	78	49	44	43	40	45
VEGETABLES:							
Asparagus.....	124	60	79	77	74	74	75
Beans, snap.....	263	118	69	68	66	65	65
Cabbage (raw).....	154	54	61	55	58	53	55
Carrots (cooked).....	227	97	63	59	55	54	55
Carrots (raw).....	280	96	26	28	23	25	25
Cauliflower.....	35	25	67	69	65	71	70
Corn.....	203	99	73	74	70	70	70
Parsnips.....	41	21	83	81	65	65	70
Peas.....	300	126	75	72	72	70	70
Spinach.....	87	46	76	75	69	68	70
Tomatoes (cooked)...	174	70	113	114	106	106	110
Tomato juice.....	249	82	129	128	125	121	125
POTATOES:							
All potatoes.....	1,980	206	91	91	86	89	90
Baked.....	168	97	109	109	106	105	110
Boiled.....	451	150	87	84	84	79	85
Creamed.....	65	36	111	113	109	103	110
Escalloped.....	91	62	121	121	117	118	120
Fried, American.....	224	89	75	76	72	74	75
Fried, French.....	44	29	69	64	70	65	65
Mashed.....	304	120	102	99	103	96	100
FRUIT:							
Apples.....	520	134	102	99	99	97	100
Bananas.....	347	116	83	83	81	83	80
Cherries.....	68	32	92	92	97	96	95
Peaches.....	413	123	117	104	113	102	110
Pears.....	150	70	112	117	113	117	115
Pineapple.....	101	49	86	90	81	88	85
Oranges and grapefruit	803	150	109	106	105	101	105
Citrus fruit juices.....	1,066	166	126	118	126	120	125
MISCELLANEOUS:							
Bread (one serving) ..	4,374	207	37	35	33	34	35
Bread (one slice).....	690	113	25	25	25	25	25
Table fat.....	4,457	199	8.0	8.1	6.6	7.4	7
Sugar—coffee.....	769	58	7.4	8.5	6.3	8.2	8
Sugar—cereal or fruit.	995	147	9.2	9.0	7.8	8.1	8
Cream—coffee.....	2,314	106	20.9	18.6	16.1	15.8	16
Cream or milk—cereal	1,154	163	94	82	90	79	85
Milk (beverage).....	1,129	153	215	207	219	207	215

portions in the calculation of dietary nutrients for a group of adult women where the absolute amount of food eaten is not known. It is recognized that these weights, like any other average values, cannot be expected to fit every case. Average weights can be justified, however, in computing dietary values when groups of subjects are studied. These averages would not be valid for use for records from women more than 70 years old.

The suggestions for average weights as given in Table 14 are a judgment based on determined mean and median weights of foods eaten and on the distribution of portion weights of the various foods studied. The mean and median weights listed in this table represent 212 of the 242 women included in the study. Owing to the omission of 30 subjects, the mean weights of portions as reported in Table 14 vary slightly from the mean values for the entire group of women as given in Tables 7 through 11. However, the differences between means for the two groups are small, seldom exceeding 3 grams.

From Table 12, it can be seen that no single weight represented an entire class of foods. For example, in the case of vegetables, 70 grams could be used as an average weight for servings of cauliflower, corn, parsnips, peas and spinach. Seventy grams could not, however, be used to represent the average weights eaten of carrots, asparagus, raw cabbage and tomatoes, which ranged from 55 to 110 grams.

In addition to differences among the various types of foods studied, differences also were found in the weights of a particular food eaten, if the method of preparation were varied. For example, the average weight for all preparations of potatoes was about 90 grams, but weights of potatoes prepared by different methods ranged from an average of 65 grams for French fried potatoes to 121 grams for escalloped potatoes.

Average weights of portions of fruit tended to fluctuate about 100 grams, the average of the eight fruits studied being 102 grams. Eighty and 85 grams, respectively, are suggested as average weights for servings of bananas and pineapple, with higher weights (110 to 115 grams) for peaches and pears. An average weight of 125 grams is suggested as a portion for both tomato and citrus fruit juices. It is interesting to note how closely this average weight approximates the 4-ounce capacity of a fruit juice glass.

Because of the variability in weights of portions of different types of meats, it was felt that no single average serving weight could be suggested for all meat. Average weights of 50 and 60 grams, respec-

tively, have been suggested for portions of ham and pork, while 65 grams is suggested for chops (all kinds) and roast beef. Somewhat higher average portion weights are suggested for ground beef and liver (70 grams), fish, lamb, veal and chicken (75 grams). Average servings of steak and loaf were found to be higher in weight than averages for the other meats studied; the suggested portion weights are 80 and 90 grams, respectively. One frankfurter (about 60 grams) was the size serving selected by this group of older women.

Thirty-five grams (approximately one and one-half slices) was an average weight for a portion of bread (Table 12). One-half tablespoon (7 grams) is suggested as the unit for calculating amounts of table fat. Two scant teaspoons (8 grams) of sugar is the average amount suggested for use with coffee or cereal. The average amount of coffee-cream used by the women studied was 16 grams (a little over one-half ounce), while the average serving of cream or milk for cereal was 85 grams (about one-third cup). The average size serving suggested for calculating milk intake is about seven ounces, or a little less than one cupful.

Although the number of subjects in the 80 and 90-year age groups was small (seven and one, respectively), and represented only 3.3 per cent of the total group, the weight of servings were sufficiently different from those for the larger group of women that certain interesting comparisons could be made (Table 10). A 30 to 35 percent decrease was found in average weights of many fruits and vegetables selected by women over 80 as compared with younger women. A greater decrease, 35 to 50 percent, was found for weights of most meats eaten. The decrease in weights of meat eaten occurred at an earlier age than the decrease in portion size of other foods, and 70 years would probably be a more accurate dividing line. After the age of 80, 23 and 31 percent less bread and cream or milk for cereal were used than the average for all age groups. On the other hand, raw cabbage, bananas, citrus fruits, liver, bacon, sugar and cream, tended to be eaten in comparable amounts by all age groups. Interestingly, gradual increases occurred with age in weights of servings of table fat and sugar added to cereal and fruit. Although the total increase in portions of these two foods was only a few grams, a definite upward trend was observed, which might be of significance if servings of these foods were eaten with each meal.

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